

**Observations On *Megasoma* with
Behavioral Notes on Some Lamellicorn Beetles
Associated With Sand Dunes**

(Coleoptera: Scarabaeidae, Lucanidae)

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The description of *Megasoma sleeperi* Hardy (1972) was based upon four female specimens collected in Joshua Tree National Monument, California. Since the original description, the senior author has examined 24 additional specimens of both sexes of this species, as well as the fragments of numerous additional individuals. The male of *Megasoma sleeperi* is described below, additional distribution records and a synonymy in *Megasoma* are presented, as well as observations of unusual behavior of *M. sleeperi* and *Pseudolucanus mazama* (LeC).

MEGASOMA PUNCTULATUS Cartwright

The following specimens have been examined: ARIZONA:

Pima Co.; Madera Canyon VIII-19-1949 (1 ♀, Los Angeles Co. Museum).

Santa Cruz Co., Peña Blanca, VII-29-1972 (2 ♀ ♀); Madera Canyon, VIII-22-1971 (1 ♂, 1 ♀) (Kane and Langston, Collns.)

MEGASOMA ELEPHAS OCCIDENTALIS Bolivar y Pieltain et al.

Megasoma elephas occidentalis Bolivar y Pieltain et al. 1963:187

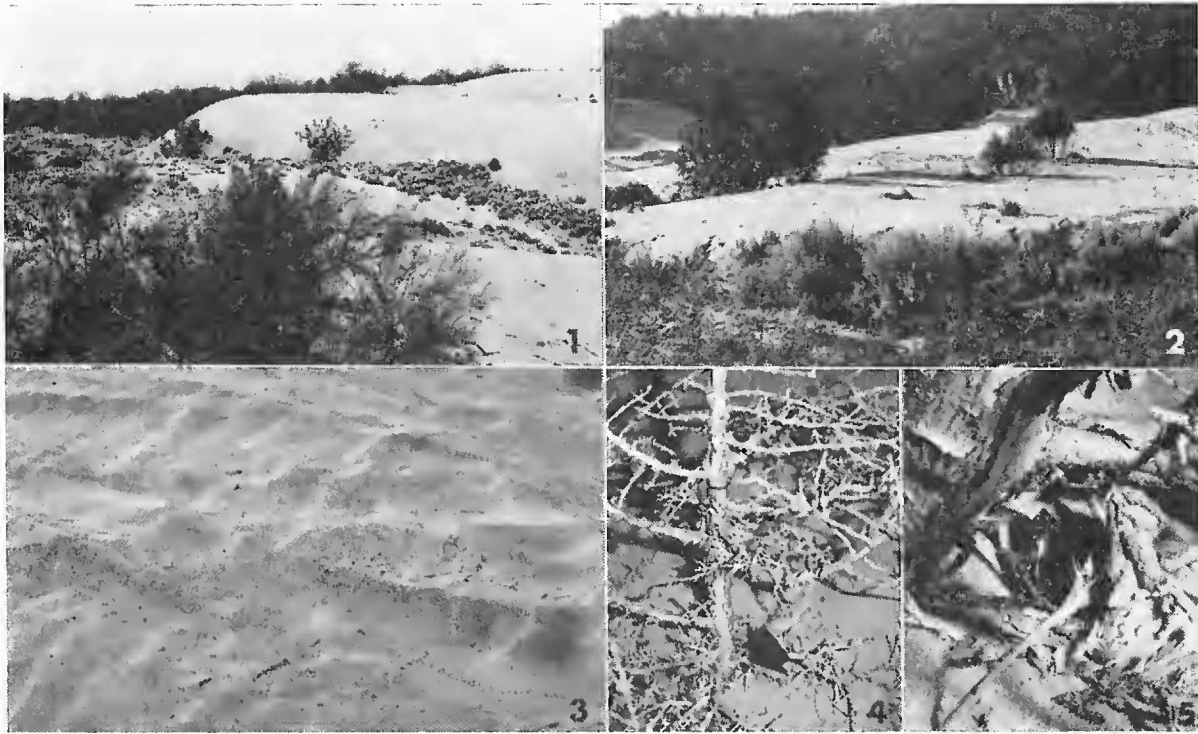
Megasoma mexicanus Fischer 1968:139, new synonymy

From an examination of the illustration accompanying the original description of *M. mexicanus*, and from the geographical distributional data (type of *M. mexicanus* from Colima, paratypes of *M. elephas occidentalis* from Colima), the above synonymy is apparent.

MEGASOMA SLEEPERI Hardy

(Fig. 6.)

MALE: Length 24.8 to 30.5 mm; width 12.5 to 15 mm. HEAD: Clypeal plane with close, medium punctures, becoming larger pits posteriorly. Vertex polished, smooth with few scattered medium punctures. Cephalic horn short, bifurcate, curved posteriorly apically. *Prothorax* coarsely punctured, punctures becoming laterally confluent, appearing rugose; prothorax occasionally lacking posterior marginal bead medially, marginal bead present laterally and anteriorly; lateral margin occasionally poorly defined anteriorly, prothorax laterally smoothly rounded from dorsal to ventral surface, without lateral carina; anterior



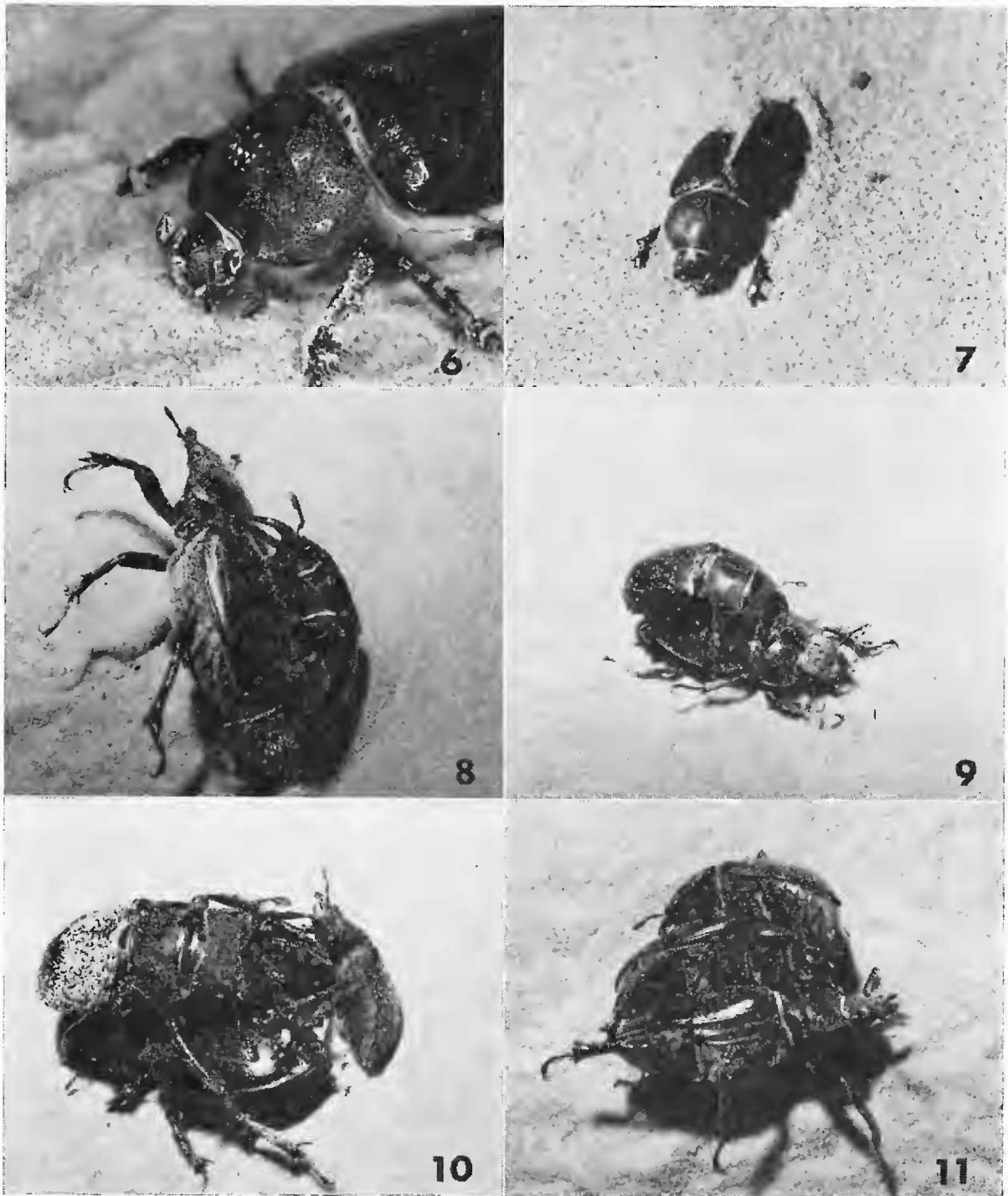
FIGS. 1-5. Fig. 1; Area 4.8 km NW Glamis, Imperial Co., California, showing advancing dunes (looking S., March). Fig. 2; Coral Pink Sand Dunes area, Kane Co., Utah, showing advancing dunes (looking S., July). Fig. 3; Tracks of adult *Pseudolucanus mazama* on sand. Figs. 4-5; Adult *P. mazama* burrowing into sand at base of dead Juniper.

prothoracic angles acute, not spinaform, not produced anteriorly; near eyes. *Elytra* with scattered fine punctures interspersed with close, very fine punctures, polished, shiny; lateral marginal bead, fading apically. *Pygidium* evenly convex, closely punctured with uniform, fine punctures, which are seldom confluent; punctures separated by less than their diameter; with recumbent, pale hair; ventral marginal head present. Six visible abdominal sternites; membranous area visible between ultimate and penultimate segments; ultimate segment emarginate apically. Body ventrally clothed with long, white hairs; appendages with long, reddish hairs.

The male of *M. sleeperi* most closely resembles the male of *M. cedrosa* Hardy, from which it can be easily distinguished by the absence of long dorsal pubescence. *M. sleeperi* is glabrous dorsally.

The following specimens of *Megasoma sleeperi* have been examined: CALIFORNIA: *Imperial Co.*; 4.8 km (3 mi.) NW Glamis, IX-16-1972, A. R. Hardy, M. S. Wasbauer, Collrs. (10 ♀♀, 3 ♂♂); same locale, various dates, numerous dead examples and fragments. *Imperial Valley*, XI-29-1937 (1 ♂, U.C. Berkeley Colln.). *Palm Desert-Deep Canyon*, VII-30-1970, E. Giesbert Collr. (1 ♀, Giesbert Colln.).

The authors have recently made several investigations of insects in the sand dune habitats in the Southwest. On a number of occasions, insects not usually associated with sand dunes have been observed to utilize vegetation killed by the drifting sand.



FIGS. 6-11. Fig. 6; Adult male *Megasoma sleeperi* as collected on sand. Fig. 7; Dead *M. sleeperi* being uncovered by wind action in trough of dune (see text). Figs. 8-11; *Pseudolucanus mazama* mating activities (see text).

In March and April 1972, a number of dead, mummified adult *Megasoma sleeperi* (Fig. 7), were collected in the troughs of the dunes, near the leading edge. Many of the specimens were fragmentary and badly broken, but a few were intact. Some individuals, which were being uncovered as the sand moved, were in a vertical position, as if they had died while digging toward the surface.

The area where the *Megasoma* were observed (about 4.8 km NW

Glamis, Imperial Co., California) is an interface area, where the sand meets an area of hardpan. The hardpan is laced with washes that drain the Chocolate Mountains to the Northeast. During flash flooding, water moves southwest towards the shores of fossil Lake Cahuilla, (now the Salton Sea), where it encounters the sand hills. The runoff is retained, creating local pockets of dense desert vegetation (Fig. 1), which support large populations of otherwise scarce organisms. These vegetated areas are slowly buried and the plants killed as the sand moves eastward at from three to five or more feet per year. Apparently, *Megasoma* oviposits in the dead or dying trees, probably utilizing Palo Verde (*Cercidium floridum* Benth.), Mesquite, (*Prosopis* sp.), or both, and develops and pupates in the buried logs. Evidently, after emergence, the adults attempt to burrow to the surface. Many are unsuccessful in reaching the surface (which may be through as much as 30 feet of sand), die, and are mummified.

On July 6, 1972, the junior author observed similar events involving *Pseudolucanus mazama* (LeC.) (Coleoptera, Lucanidae) at the Coral Pink Sand dunes near Kanab, Kane County, Utah. The area is a Pinyon-Juniper association in a valley bordered by red sandstone mountains. First indications of beetle activity were noted at the north end of the dunes, about 30 minutes before dark. In this area, Juniper Trees (*Juniperus* sp.) were being covered by drifting dunes (Fig. 2), which had killed the smaller trees. Near the bases of the trees and stumps, which projected from the sand, were found parts of adult beetles which were still exhibiting signs of life after a recent attack by an unidentified predator, probably vertebrate.

Several beetles were seen emerging from the fine unconsolidated sand in the vicinity of projecting stumps and the bases of live trees. By nightfall, more than 100 beetles were observed on the sand in an area about 30 meters by 65 meters. First observations were of apparent random wandering, followed by copulation when males and females met. Mated pairs were observed struggling and rolling on the sand (Fig. 8), or with the male mounted while the female continued to move across the dune (Fig. 9). Males outnumbered females and often congregations of six to eight beetles were found, with three to four males clustered about a single female (Figs. 10, 11). It appeared that only the first male mated with the female. A preponderance of males also occurs in *Pseudolucanus placidus* Say (Mathieu, 1969:1059).

After approximately one hour, the beetles began to burrow into the sand, and within another 15 minutes all except a few wandering males were gone. The beetles usually burrowed into the dunes within 25 cm of

a stump or tree (Figs. 4, 5), but several entered the sand at distances of from four to five meters from the nearest exposed juniper. No attempt was made to determine whether there was dead vegetation beneath the sand at these remote points of entry.

At the peak of evening activity, living Junipers within 100 meters of the breeding congregations, but away from the dunes, were inspected for beetles with negative results. This may indicate that either dead or dying junipers or sand or both are important to the life history of *P. mazama*. Mathieu (1969:1059) indicates that females of *P. placidus* use "a typical sandy-soil habitat" in breeding.

The following morning no evidence of beetles was observed except the tracks of entering and leaving adults (Fig. 3). Several excavations at the bases of stumps where Lucanids were seen to burrow the previous night resulted in the location of a few adults, all at least 45 cm. below the surface.

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